DETAILED DESCRIPTION

[Detailed explanation of a design]
[0001]
[Industrial Application]
This design is related with the piezo-electric sounding body included in pocket mold electronic equipment, such as a pocket bell, an IC card, and a cellular phone, etc. in more detail about the piezo-electric sounding body.
[0002]
[Description of the Prior Art]
In pocket mold electronic equipment, such as a pocket bell, an IC card, and a cellular phone, although the piezo-electric sounding body is used as a sound component, since a user carries this pocket mold electronic equipment, it is easy to produce the situation of dropping pocket mold electronic equipment to the ground, a floor line, etc., and, in such a case, the impact strength of the piezo-electric sounding body poses a problem.
[0003]
The conventional example of the piezo-electric sounding body used for pocket mold electronic equipment is explained with reference to drawing 11 and drawing 12 .
[0004]
The piezo-electric sounding body 30 shown in drawing 11 and drawing 12 has the piezo-electric oscillating object 13 of uni-morph structure with the diaphragm 15 which consists of said piezoelectric device 14 arranged in the condition that the tabular piezoelectric device 14 attends the sound room 12 of the support case 11 where it has the sound room 12 as for which the upper part carried out opening, and this support case 11, and a conductor, and the electrode 16 prepared in the base center section of the sound room 12 in said support case 11.
[0005]
The both-ends side of said diaphragm 15 is respectively bent in the shape of KO, forms polar zone 15a and 15b, and results in a base side through the both-ends side of said support case 11.
[0006]
The flat-surface configuration of the support case 11 where said piezo-electric oscillating object 13 was removed is shown in drawing 12 .
[0007]
Said piezo-electric oscillating object 13 is positioned by inserting in Projections 17a and 17b the hole which the notches 11a and 11b corresponding to said polar zone 15a and 15b were formed in this support case 11, and Projections 17a and 17b protruded on it respectively from Notches 11a and 11b, and was respectively prepared in said polar zone 15a and 15b.
[0008]
[Problem(s) to be Solved by the Device]
However, when for example, a fall impact joins this piezo-electric sounding body 20 in the case of the piezo-electric sounding body 30 mentioned above, said piezoelectric device 14 will be in the curve condition more than that flexural strength, and as shown in drawing 13 , there is a problem that Crack c will arise in a piezoelectric device 14, or a part of piezoelectric device 14 will exfoliate from central partial 15c of a diaphragm 15 as shown in drawing 14 , and the pronunciation function of the piezo-electric sounding body 30 will be spoiled.
[0009]

Then, this design aims at offering a crack and the piezo-electric sounding body which can prevent exfoliation in part, even when an impact is added.
[0010]
[Means for Solving the Problem]
This design prepares the curve prevention member which prevents the curve more than the flexural strength of said piezoelectric device in said sound room in the piezo-electric sounding body which has the support case in which the sound room was formed, and the piezo-electric oscillating object of the uni-morph structure arranged in the condition that a piezoelectric device attends the sound room of this support case.
[0011]
Said curve prevention member is respectively prepared in the both sides of electrode one side **** prepared in the base center section of the sound room in said support case more than a piece at least.
[0012]
Moreover, said curve prevention member is considered as the configuration which protruded [to / from the opposed face of the support case which is divided up and down and forms a sound room / near the uni-morph structure of a piezo-electric oscillating object arranged to said sound interior of a room a top face or near the inferior surface of tongue] more than the piece at least respectively.
[0013]
[Function]
since the curve prevention member which prevents the curve more than the flexural strength of said piezoelectric device was prepared in the sound room of said support case according to the piezo-electric sounding body of a configuration of having mentioned above, even if the impact by fall etc. joins this piezo-electric sounding body and the external force more than flexural strength acts on said piezoelectric device, the curve more than the flexural strength of a piezoelectric device prevents by the curve prevention member -- having -- thereby -- the crack initiation of a piezoelectric device, and a part -- exfoliation can be prevented.
[0014]
one side or the both sides of an electrode which prepared said curve prevention member in the base center section of the sound room in said support case -- each -- preparing more than a piece, even if few -- these curve prevention members -- the curve more than the flexural strength of a piezoelectric device -- two or more places -- preventing -- the crack initiation of a piezoelectric device, and a part -- exfoliation can be prevented certainly.
[0015]
from the opposed face of the support case which is divided up and down in said curve prevention member, and forms a sound room up to near the uni-morph structure of a piezo-electric oscillating object arranged to said sound interior of a room a top face or near the inferior surface of tongue -- each -- considering as the configuration which protruded more than the piece, even if few -- the top face or the inferior surface of tongue of said piezo-electric oscillating object -- setting -- the curve more than flexural strength -- respectively -- preventing -- the crack initiation of a piezoelectric device, and a part -- exfoliation can prevent certainly.
[0016]
[Example]
Below, the example of this design is explained at a detail.
[0017]
The support case 11 which consists of an insulator ingredient which has the sound room 12 which carried out opening so that the same end-face four-corners section as the conventional example might be formed in the shape of ** and, as for the piezo-electric sounding body 1 shown in drawing 1 and drawing 2 , the upper part might present a round shape, The piezo-electric oscillating object 13 of uni-morph structure with the diaphragm 15 which consists of said piezoelectric device 14 arranged in the condition that the tabular piezoelectric device 14 attends the sound room 12 of this support case 11, and a conductor, It has the electrode 16 prepared in the base center section of the sound room 12 in said support case 11, and the curve prevention member 2 which prevents the curve more than the flexural strength of said piezoelectric device 14 prepared in said sound room 12.
[0018]
The polar zone 15a and 15b respectively bent in the shape of KO is formed in the both-ends side of said diaphragm 15, and central partial 15c of said diaphragm 15 is formed in disc-like, and said polar zone 15a and 15b is considered as the

arrangement which results in a base side through each both-ends side, being close to said support case 11.
[0019]
The flat-surface configuration of the support case 11 where said piezo-electric oscillating object 13 was removed is shown in drawing 3 .
[0020]
Said piezo-electric oscillating object 13 is positioned by inserting in Projections 17a and 17b the hole which the notches 11a and 11b corresponding to said polar zone 15a and 15b were formed in this support case 11, and Projections 17a and 17b protruded on it respectively from Notches 11a and 11b, and was respectively prepared in said polar zone 15a and 15b.
[0021]
As shown in drawing 3 , every three one side and a total of six curve prevention columns 3 which have been arranged along with this electrode 16 on both sides of the electrode 16 prepared in the base center section of the sound room 12 in the support case 11 constitute said curve prevention member 2.
[0022]
As shown in drawing 2 , each curve prevention column 3 protrudes so that it may result near the inferior surface of tongue of said piezoelectric device 14 from the base of said sound room 12.
[0023]
Next, an operation of said piezo-electric sounding body 1 is explained also with reference to drawing 4 .
[0024]
Since a total of six curve prevention columns 3 which constitute the curve prevention member 3 which prevents the curve more than the flexural strength of said piezoelectric device 14 are formed in the sound room 12 of said support case 11 according to this piezo-electric sounding body 1 The impact by fall etc. joins this piezo-electric sounding body 1, as shown in drawing 4 , when said piezoelectric device 14 tends to curve more than that flexural strength, the inferior surface of tongue of a piezoelectric device 14 contacts the top face of said curve prevention column 3, and the curve of a piezoelectric device 14 is prevented certainly. consequently -- the case where the impact by fall etc. joins the piezo-electric sounding body 1 -- the crack initiation of a piezoelectric device 14, and a part -- exfoliation can be prevented.
[0025]
moreover -- since it arranges three one side at a time a total of six of each of said curve prevention column 3 along with said electrode 16 -- these curve prevention columns 3 -- the curve of a piezoelectric device 14 -- six places -- preventing -- the crack initiation of a piezoelectric device 14, and a part -- exfoliation can be prevented certainly.
[0026]
Next, other examples of this design are explained with reference to drawing 5 thru/or drawing 10 .
[0027]
The square tubed lower support case 21 in which piezo-electric sounding-body 1A shown in drawing 5 and drawing 6 was equipped with bottom plate 21a, and the upper part carried out opening, The up support case 22 of the shape of a square which lids opening of this lower support case 21, and forms the sound room 23 between the lower support cases 21, The piezo-electric oscillating object 13 of the uni-morph structure of the diaphragm 15 which consists of the piezoelectric device 14 and conductor which were supported by step 21b prepared in the inside wall of said lower support case 21, it protruded on the upper part from bottom plate 21a of said lower support case 21, and upper limit was made to face near said piezoelectric device 14 -- with lower curve prevention member 24a more than a piece at least it protruded caudad from the inferior surface of tongue of said up support case 22, and the lower limit was made to overlook near said diaphragm 15 -- with up curve prevention member 24b more than a piece at least Projected part 22a which protrudes towards the piezo-electric oscillating object 13 side from the inferior-surface-of-tongue flank of said up support case 22, and fixes this piezo-electric oscillating object 13 on said step 21b, The component lateral electrode section 25 which covered the pars basilaris ossis occipitalis and has been arranged from one side attachment wall of said lower support case 21 as shown also in drawing 7 thru/or drawing 9 , and the diaphragm lateral electrode section 26 which covered the pars basilaris ossis occipitalis and has been arranged from the side attachment wall of another side of said lower support case 21 are provided. In addition, said lower curve prevention member 24a and up curve prevention member 24b are good also as a configuration which prepares only either.
[0028]
The component lateral electrode section 25 is connected to said piezoelectric device 14 by connection polar-zone 25a

drawn at the sound room 23 side through the interior of the thick section of said lower support case 21, and said up support case 22.
[0029]
Moreover, the diaphragm lateral electrode section 26 is connected to said diaphragm 15 by connection polar-zone 26a drawn at the sound room 23 side through the interior of the thick section of said lower support case 21, and said up support case 22.
[0030]
In addition, 27 are a sound emission hole which opens for free passage said sound room 23 established in the lower support case 21, and the open air among drawing 5 , drawing 6 , and drawing 8 .
[0031]
Even when according to piezo-electric soundling-body 1A of a configuration of having mentioned above the impact by fall etc. tends to join the piezo-electric soundling body 1 and said piezoelectric device 14 tends to curve more than the flexural strength, as shown in drawing 10 said lower curve prevention member 24a and up curve prevention member 24b prevent respectively the curve more than the flexural strength of said piezoelectric device 14 on an inferior surface of tongue and a top face -- ******** -- consequently, the crack initiation of a piezoelectric device 14 and a part -- exfoliation can be prevented certainly.
[0032]
In addition, each protrusion number of said lower curve prevention member 24a and up curve prevention member 24b can be carried out as the arbitration number.
[0033]
This design is not limited to the example mentioned above, and deformation various by within the limits of the summary is possible for it.
[0034]
[Effect of the Device]
Since it considered as the configuration mentioned above according to this design explained in full detail above, even if the external force more than flexural strength acts on said piezoelectric device, the curve of a piezoelectric device is prevented by the curve prevention member, and, thereby, the crack initiation and the piezo-electric sounding body which can prevent exfoliation in part of a piezoelectric device can be offered.
[0035]
moreover, one side or the both sides of an electrode which prepared the curve prevention member in the base center section of the sound room in a support case according to this design -- each -- since it prepared more than the piece even if few -- these curve prevention members -- the curve of a piezoelectric device -- two or more places -- preventing -- the crack initiation of a piezoelectric device, and a part -- the piezo-electric sounding body which can prevent exfoliation certainly can be offered.
[0036]
furthermore -- according to this design -- a curve prevention member -- up to near the top face of the piezo-electric oscillating object of uni-morph structure, or the inferior surface of tongue -- each -- since it protruded more than the piece even if few -- the top face or inferior surface of tongue of a piezo-electric oscillating object -- setting -- the curve more than flexural strength -- respectively -- preventing -- the crack initiation of a piezoelectric device, and a part -- the piezo-electric sounding body which can prevent exfoliation certainly can be offered.

[Translation done.]

DESCRIPTION OF DRAWINGS

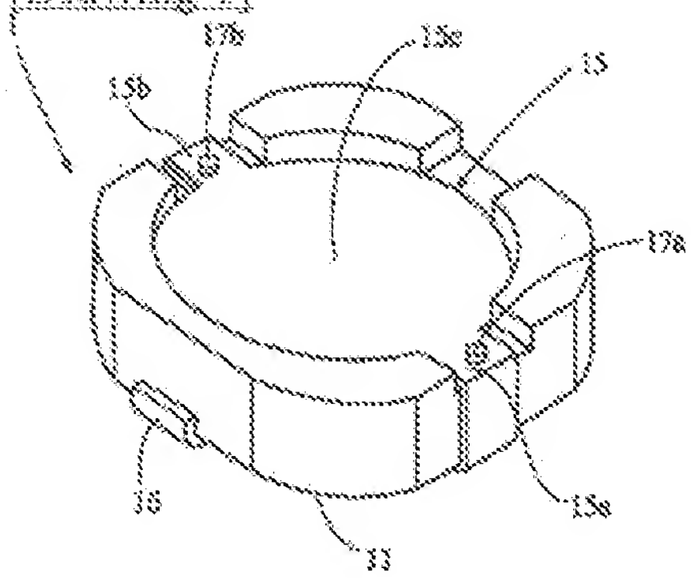
[Brief Description of the Drawings]
[Drawing 1] The perspective view showing the example of the piezo-electric sounding body of this design
[Drawing 2] The sectional view showing the piezo-electric sounding body of this example
[Drawing 3] The top view of the support case in the piezo-electric sounding body of this example
[Drawing 4] The partial enlarged drawing showing the contact condition of the piezoelectric device and curve prevention member in the piezo-electric sounding body of this example
[Drawing 5] The perspective view showing other examples of the piezo-electric sounding body of this design
[Drawing 6] The sectional view showing other examples of the piezo-electric sounding body of this design
[Drawing 7] The top view showing other examples of the piezo-electric sounding body of this design
[Drawing 8] The front view showing other examples of the piezo-electric sounding body of this design
[Drawing 9] The bottom view showing other examples of the piezo-electric sounding body of this design
[Drawing 10] The partial enlarged drawing showing the contact condition of the piezoelectric device and curve prevention member in other examples of the piezo-electric sounding body of this design
[Drawing 11] The sectional view showing the conventional piezo-electric sounding body
[Drawing 12] The top view of the support case of the conventional piezo-electric sounding body
[Drawing 13] The partial enlarged drawing showing the crack initiation condition of the piezoelectric device in the conventional piezo-electric sounding body
[Drawing 14] The piezoelectric device in the conventional piezo-electric sounding body is the partial enlarged drawing showing a desquamative state a part.
[Description of Notations]
1 1A The piezo-electric sounding body
2 Curve Prevention Member
3 Curve Prevention Column
11 Support Case
12 Sound Room
13 Piezo-electric Oscillating Object
14 Piezoelectric Device
15 Diaphragm
16 Electrode
21 Lower Support Case
22 Up Support Case
24a Lower curve prevention member
24b Up curve prevention member

* NOTICES *

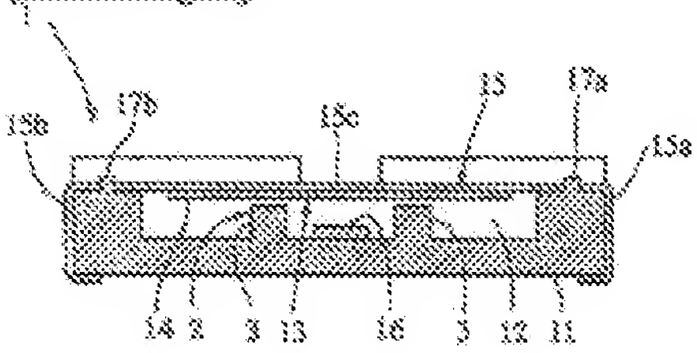
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

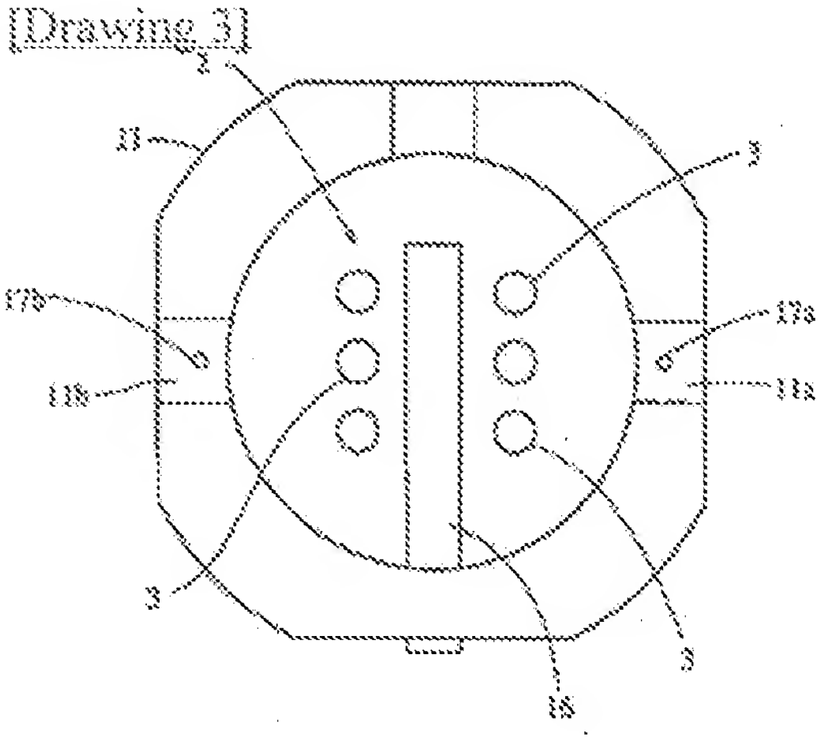
[Drawing 1]



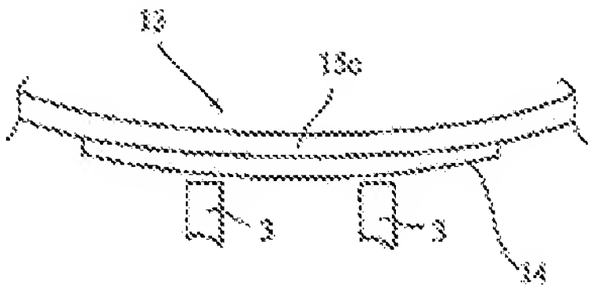
[Drawing 2]



[Drawing 3]



[Drawing 4]



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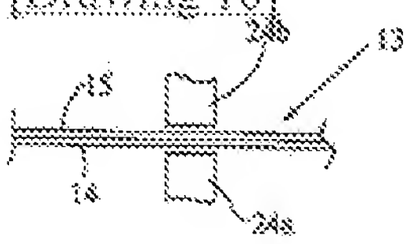
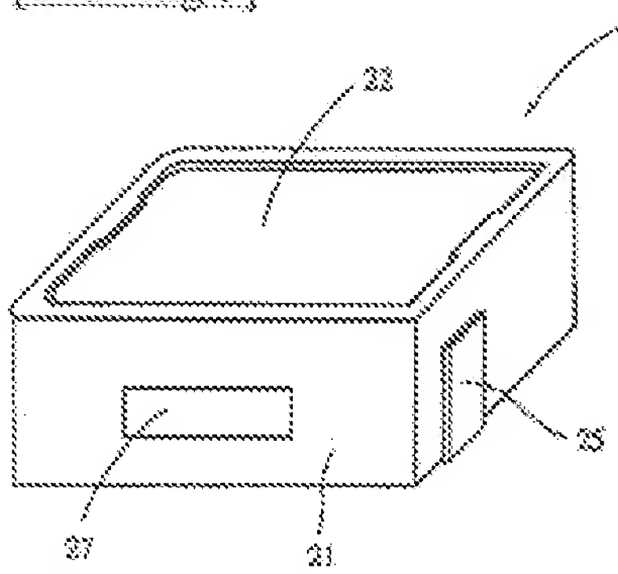


[Drawing 5]



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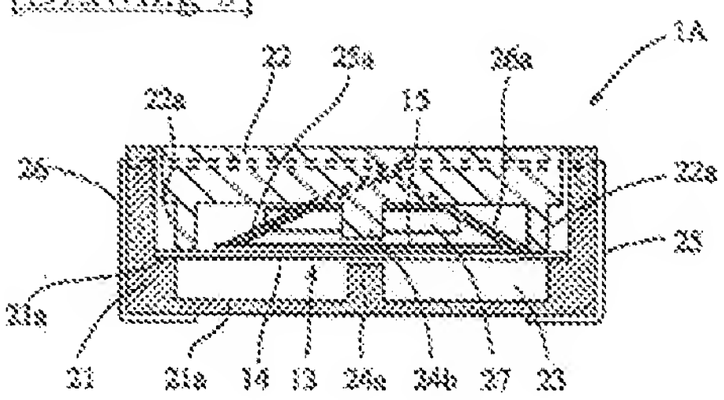
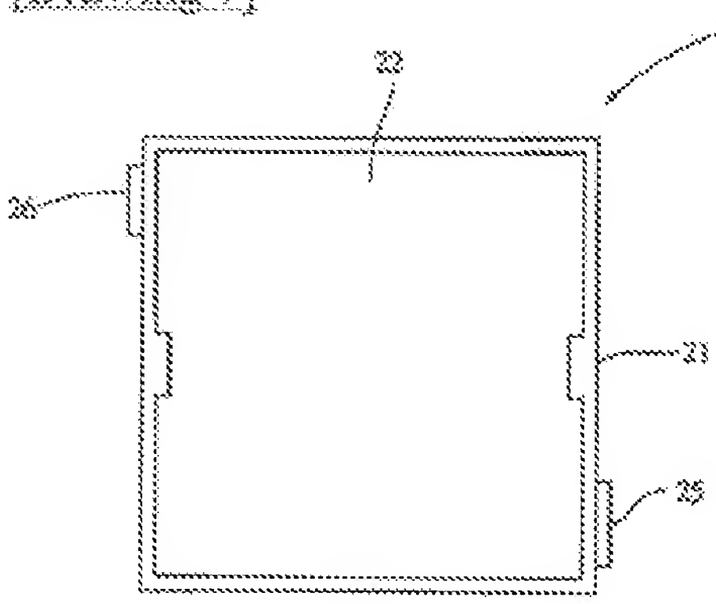
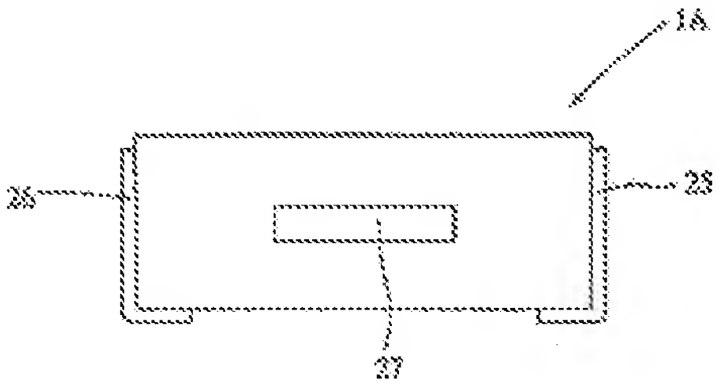


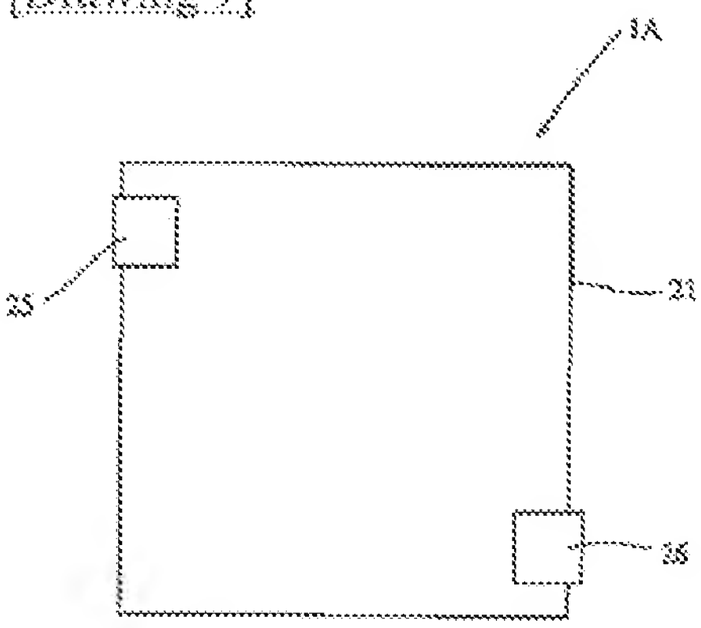
[Drawing 7]



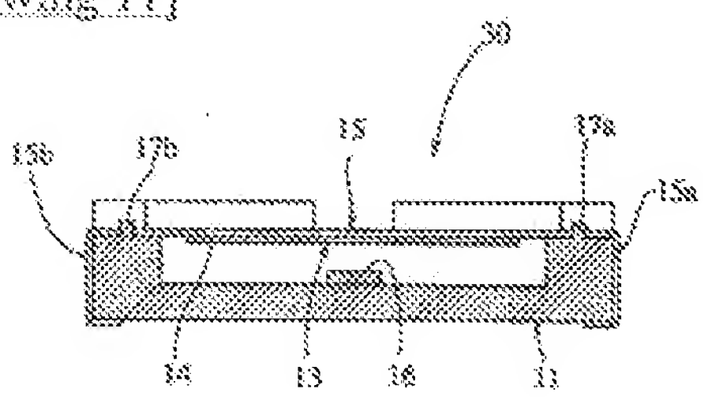
[Drawing 8]



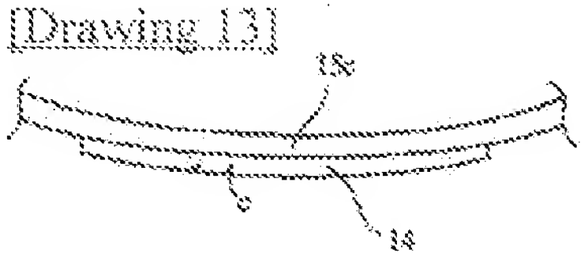
[Drawing 9]



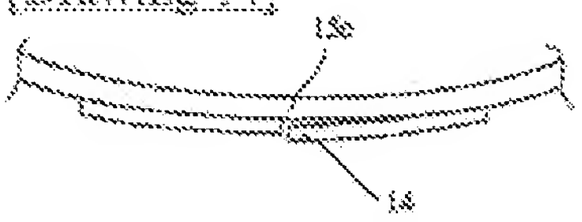
[Drawing 11]



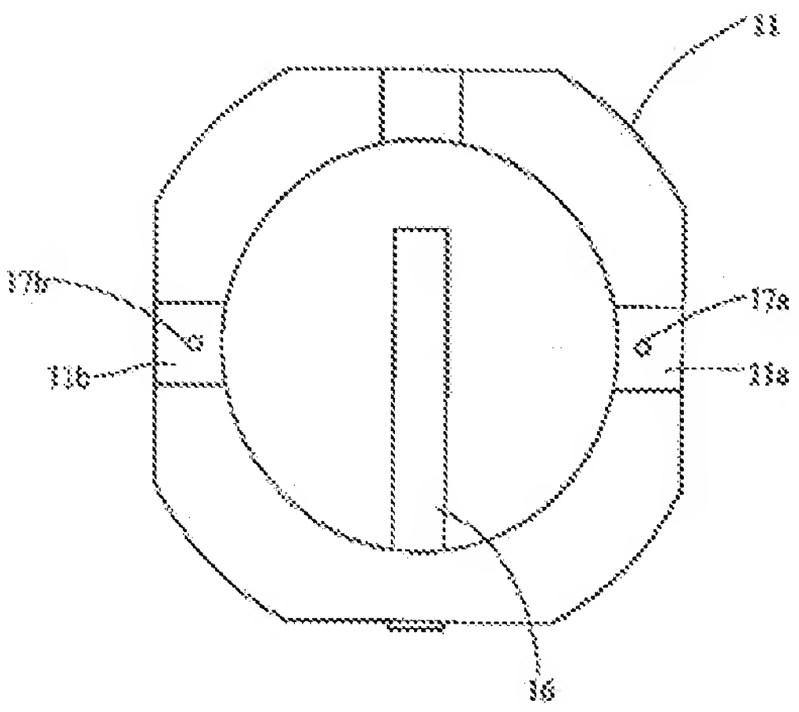
[Drawing 13]



[Drawing 14]



[Drawing 12]



[Translation done.]

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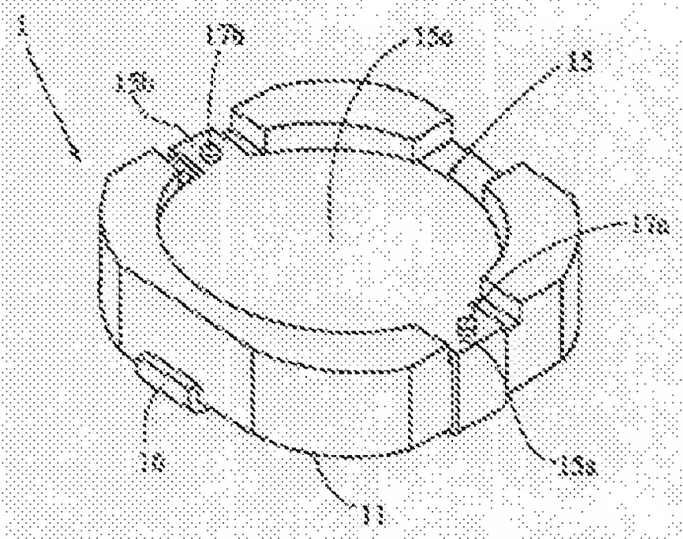
(54)【考案の名称】圧電発音体

(57)【要約】
【目的】　本考案は、衝撃が加わった場合でもクラックや一部剥離を防止できる圧電発音体を提供する。
【構成】　本考案は、音響室を形成した支持ケース１１と、この支持ケース１１の音響室１２に圧電素子１３が隙の状態に配置したユニモルフ構造の圧電振動体１４とを有する圧電発音体１において、前記音響室１２に前記圧電素子１３の曲げ強度以上の湾曲を防止する湾曲防止部材８を設けたものである。この構成により、落下等による衝撃が加わり、前記圧電素子１３に曲げ強度以上の外力が作用しても湾曲防止部材８により圧電素子１３の湾曲が防止され、圧電素子１３のクラック発生や一部剥離を防止できる。



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【実用新案登録請求の範囲】

【請求項１】　音響室を形成した支持ケースと、この支持ケースの音響室に圧電素子が臨む状態に配置したユニモルフ構造の圧電振動体とを有する圧電発音体において、前記音響室に前記圧電素子の曲げ強度以上の湾曲を防止する湾曲防止部材を設けたことを特徴とする圧電発音体。

【請求項２】　前記湾曲防止部材は、前記支持ケースにおける音響室の底面中央部に設けた電極の片側又は両側に各々少なくとも一個以上設けたものである請求項１記載の圧電発音体。

【請求項３】　前記湾曲防止部材は、上下に分割され音響室を形成する支持ケースの対向面から、前記音響室内に配置したユニモルフ構造の圧電振動体の上面又は下面近傍まで各々少なくとも一個以上突設したものである請求項１記載の圧電発音体。

【図面の簡単な説明】

【図１】本考案の圧電発音体の実施例を示す斜視図

【図２】本実施例の圧電発音体を示す断面図

【図３】本実施例の圧電発音体における支持ケースの平面図

【図４】本実施例の圧電発音体における圧電素子と湾曲防止部材との当接状態を示す部分拡大図

【図５】本考案の圧電発音体の他の実施例を示す斜視図

【図６】本考案の圧電発音体の他の実施例を示す断面図

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【図７】本考案の圧電発音体の他の実施例を示す平面図

【図８】本考案の圧電発音体の他の実施例を示す正面図

【図９】本考案の圧電発音体の他の実施例を示す底面図

【図１０】本考案の圧電発音体の他の実施例における圧電素子と湾曲防止部材との当接状態を示す部分拡大図

【図１１】従来の圧電発音体を示す断面図

【図１２】従来の圧電発音体の支持ケースの平面図

【図１３】従来の圧電発音体における圧電素子のクラック発生状態を示す部分拡大図

【図１４】従来の圧電発音体における圧電素子の一部剥離状態を示す部分拡大図

【符号の説明】

１，１Ａ　圧電発音体

２　湾曲防止部材

３　湾曲防止枠

１１　支持ケース

１２　音響室

１３　圧電振動体

１４　圧電素子

１５　振動板

１６　電極

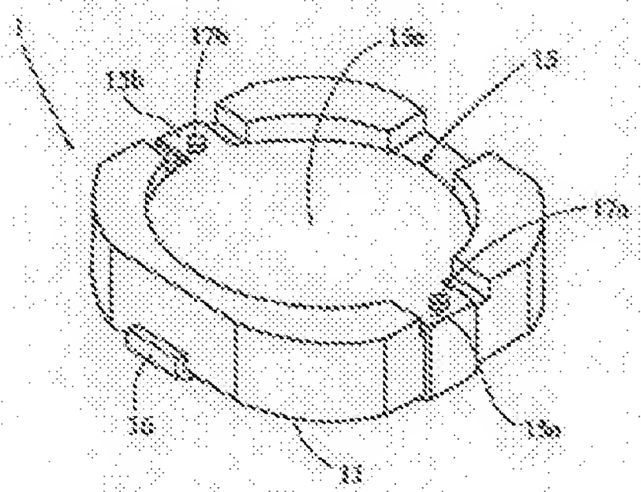
２１　下部支持ケース

２２　上部支持ケース

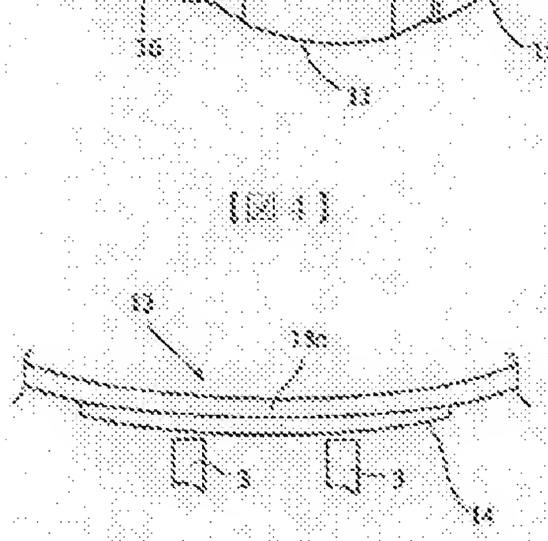
２４ａ　下部湾曲防止部材

２４ｂ　上部湾曲防止部材

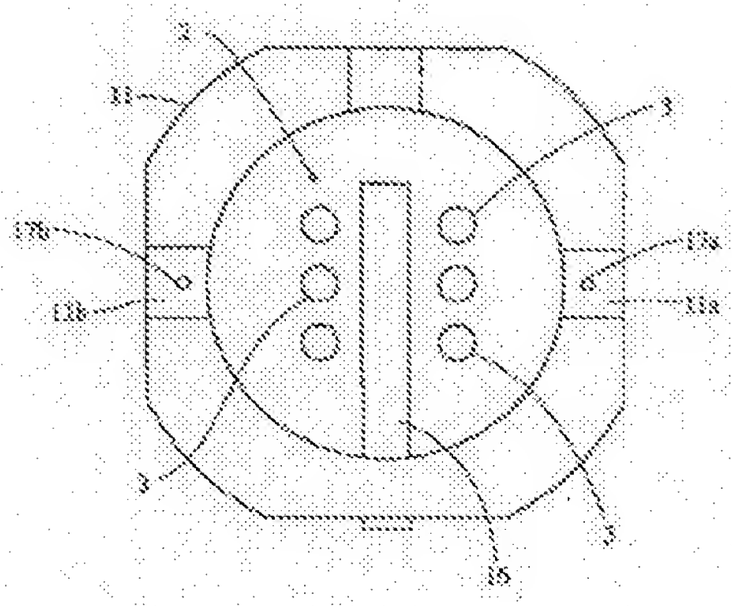
【図１】



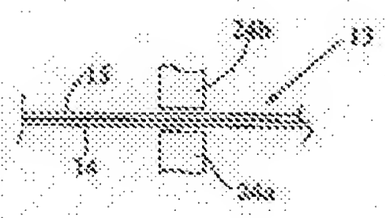
【図２】



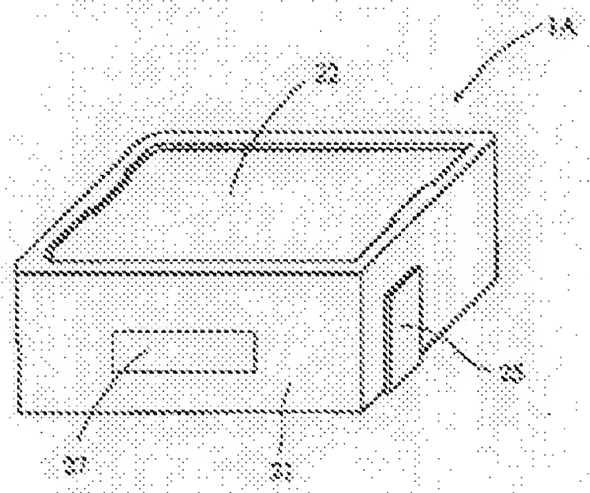
【図３】



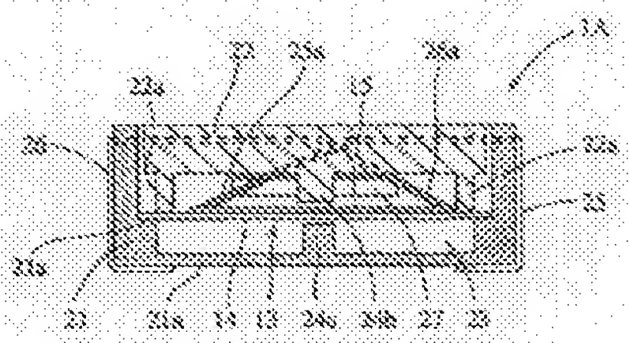
【図１０】



【図５】



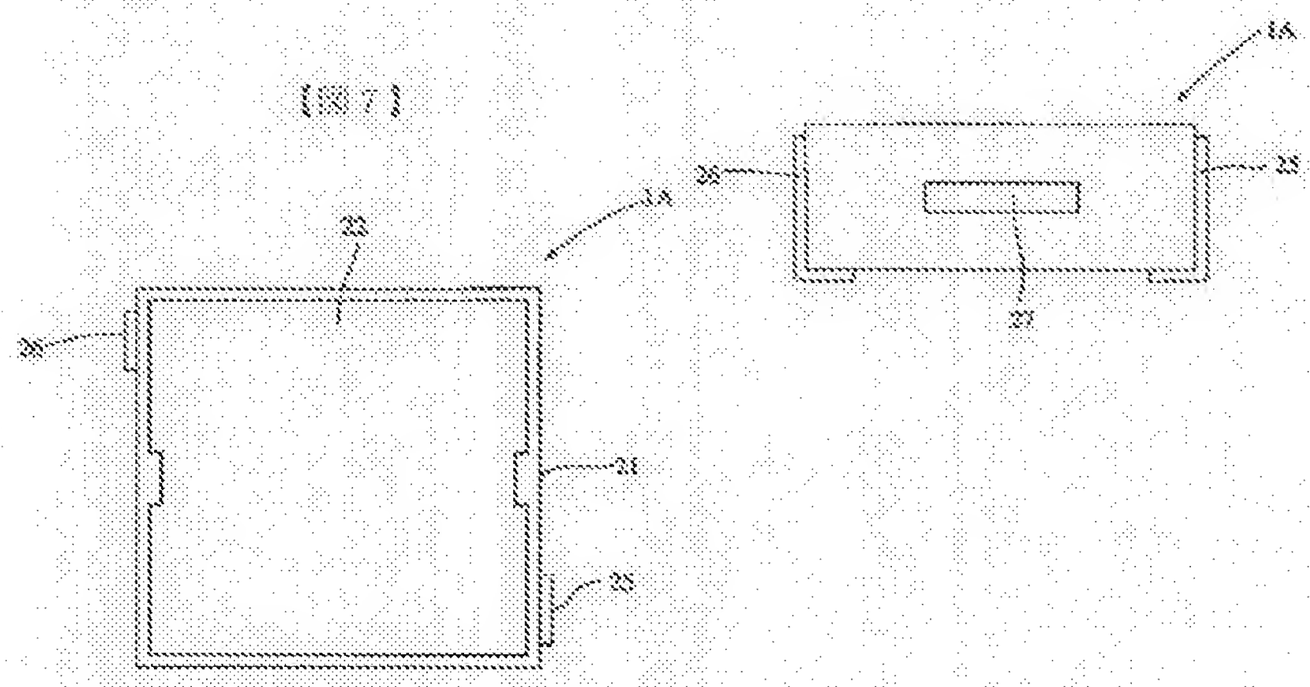
【図６】



【図１３】

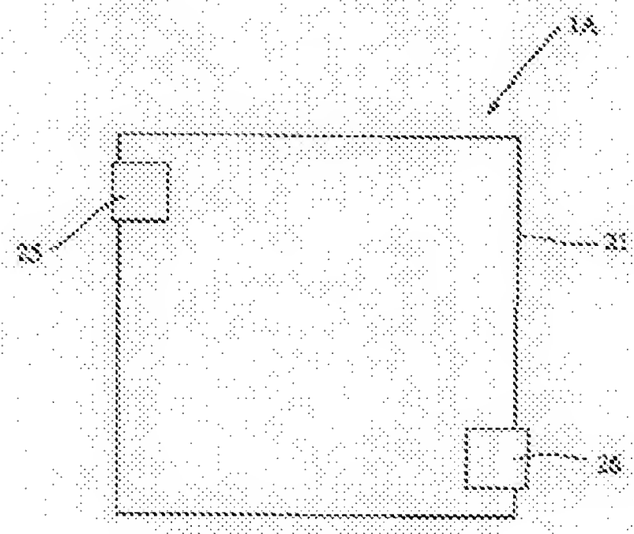
【図１４】

【図７】

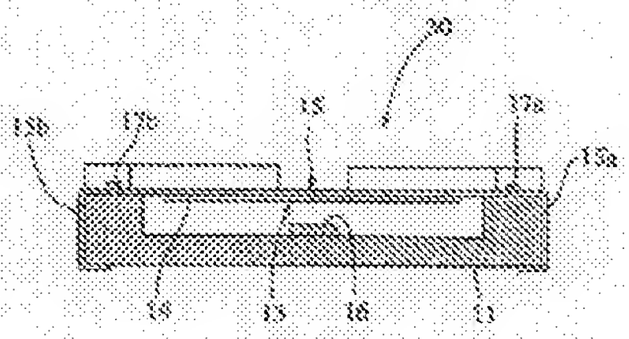


【図８】

【図９】



【図１１】



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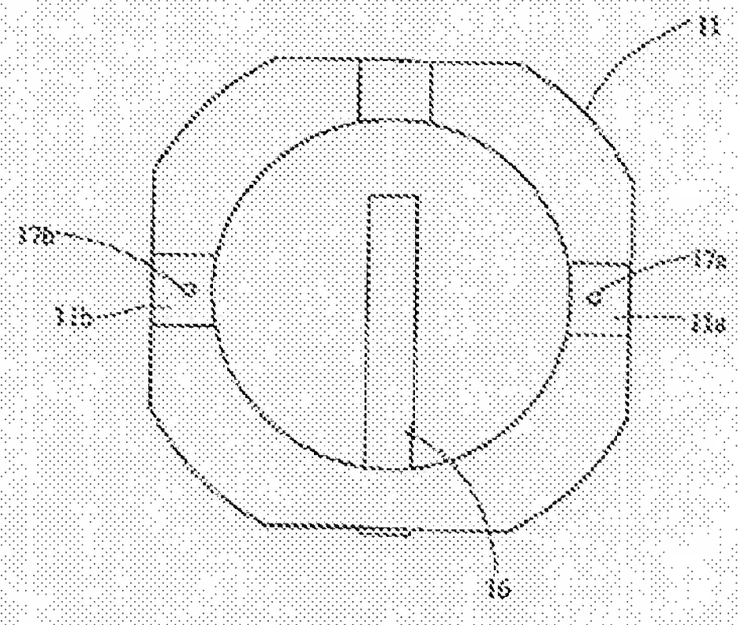
【図１２】



【考案の詳細な説明】

【０００１】

【産業上の利用分野】

本考案は、圧電発音体に関し、より詳しくは、ポケットベル、ＩＣカード、携帯電話等の携帯型電子機器等に組み込まれる圧電発音体に関する。

【０００２】

【従来の技術】

ポケットベル、ＩＣカード、携帯電話等の携帯型電子機器においては、音響素子として圧電発音体を用いているが、使用者がこの携帯型電子機器を持ち運ぶので地面、床面等に携帯型電子機器を落下させる事態が生じ易く、このような場合に圧電発音体の衝撃強度が問題となる。

【０００３】

携帯型電子機器に用いられる圧電発音体の従来例を図１１，図１２を参照して説明する。

【０００４】

図１１，図１２に示す圧電発音体３０は、上部が開口した音響室１２を有する支持ケース１１と、この支持ケース１１の音響室１２に板状の圧電素子１４が撓み状態に配置した前記圧電素子１４と導体からなる振動板１５とのユニモルフ構造の圧電振動体１３と、前記支持ケース１１における音響室１２の底面中央部に設けた電極１６とを有している。

【０００５】

前記振動板１５の両端部側は、各々コ字状に折曲されて電極部１５ａ，１５ｂを形成し、前記支持ケース１１の両端面を経て底面側に至るようになっている。

【０００６】

前記圧電振動体１３を除去した支持ケース１１の平面形状を図１２に示す。

【０００７】

この支持ケース１１には、前記電極部１５ａ，１５ｂに対応する切欠部１１ａ，１１ｂが形成され、かつ、切欠部１１ａ，１１ｂから各々突起１７ａ，１７ｂが突設されて前記電極部１５ａ，１５ｂに各々設けた孔を突起１７ａ，１７ｂに

挿入することで、前記圧電振動体１３の位置決めを行うようになっている。

【０００８】

【考案が解決しようとする課題】

しかしながら、上述した圧電発音体３０の場合、この圧電発音体２０に例えば落下衝撃が加わった場合、前記圧電素子１４がその曲げ強度以上の湾曲状態になり、図１３に示すように、圧電素子１４にクラックｃが生じたり、図１４に示すように、圧電素子１４の一部が振動板１５の中央部分１５ｃから剥離したりして圧電発音体３０の発音機能が損なわれてしまうという問題がある。

【０００９】

そこで、本考案は、衝撃が加わった場合でもクラックや一部剥離を防止できる圧電発音体を提供することを目的とするものである。

【００１０】

【課題を解決するための手段】

本考案は、音響室を形成した支持ケースと、この支持ケースの音響室に圧電素子が縁り状態に配置したユニモルフ構造の圧電振動体とを有する圧電発音体において、前記音響室に前記圧電素子の曲げ強度以上の湾曲を防止する湾曲防止部材を設けたものである。

【００１１】

前記湾曲防止部材は、前記支持ケースにおける音響室の底面中央部に設けた電極片側又は両側に各々少なくとも一個以上設けたものである。

【００１２】

また、前記湾曲防止部材は、上下に分割され音響室を形成する支持ケースの対向面から、前記音響室内に配置したユニモルフ構造の圧電振動体の上面又は下面近傍まで各々少なくとも一個以上突設した構成としたものである。

【００１３】

【作用】

上述した構成の圧電発音体によれば、前記支持ケースの音響室に前記圧電素子の曲げ強度以上の湾曲を防止する湾曲防止部材を設けたので、この圧電発音体に落下等による衝撃が加わり、前記圧電素子に曲げ強度以上の外力が作用しても湾

曲防止部材により圧電素子の曲げ強度以上の湾曲が防止され、これにより、圧電素子のクラック発生や一部剥離を防止できる。

【００１４】

前記湾曲防止部材を、前記支持ケースにおける音響室の底面中央部に設けた電極の片側又は両側に各々少なくとも一個以上設けることにより、これらの湾曲防止部材により圧電素子の曲げ強度以上の湾曲を複数箇所で防止し圧電素子のクラック発生や一部剥離を確実に防止できる。

【００１５】

前記湾曲防止部材を、上下に分割され音響室を形成する支持ケースの対向面から、前記音響室内に配置したユニモルフ構造の圧電振動体の上面又は下面近傍まで各々少なくとも一個以上突設した構成とすることにより、前記圧電振動体の上面又は下面において曲げ強度以上の湾曲を各々防止し、圧電素子のクラック発生や一部剥離を確実に防止できる。

【００１６】

【実施例】

以下に、本考案の実施例を詳細に説明する。

【００１７】

図１，図２に示す圧電発音体１は、従来例と同様な端面四隅部が円状に形成され、かつ、上部が円形を呈するように開口した音響室１２を有する絶縁体材料からなる支持ケース１１と、この支持ケース１１の音響室１２に板状の圧電素子１４が隙め状態に配置した前記圧電素子１４と導体からなる振動板１５とのユニモルフ構造の圧電振動体１３と、前記支持ケース１１における音響室１２の底面中央部に設けた電極１６と、前記音響室１２に設けた前記圧電素子１４の曲げ強度以上の湾曲を防止する湾曲防止部材２とを有している。

【００１８】

前記振動板１５の両端部側に、各々コ状に折曲した電極部１５ａ，１５ｂを形成し、また、前記振動板１５の中央部分１５ｃは円板状に形成され、前記電極部１５ａ，１５ｂを前記支持ケース１１に密接しつつ各両端面を経て底面側に至る配置としている。

【００１９】

前記圧電振動体１３を除去した支持ケース１１の平面形状を図３に示す。

【００２０】

この支持ケース１１には、前記電極部１５ａ，１５ｂに対応する切欠部１１ａ，１１ｂが形成され、かつ、切欠部１１ａ、１１ｂから各々突起１７ａ，１７ｂが突設されて前記電極部１５ａ，１５ｂに各々設けた孔を突起１７ａ，１７ｂに挿入することで、前記圧電振動体１３の位置決めを行うようになっている。

【００２１】

前記湾曲防止部材２は、図３に示すように、支持ケース１１における音響室１２の底面中央部に設けた電極１６の両側にこの電極１６に沿って配置した片側３個ずつ、合計６個の湾曲防止柱３により構成している。

【００２２】

各湾曲防止柱３は、図２に示すように、前記音響室１２の底面から前記圧電素子１４の下面近傍に至るように突設している。

【００２３】

次に、前記圧電発音体１の作用を図４をも参照して説明する。

【００２４】

この圧電発音体１によれば、前記支持ケース１１の音響室１２に前記圧電素子１４の曲げ強度以上の湾曲を防止する湾曲防止部材３を構成する合計６個の湾曲防止柱３を設けているので、この圧電発音体１に落下等による衝撃が加わり、前記圧電素子１４が、図４に示すように、その曲げ強度以上に湾曲しようとする場合に前記湾曲防止柱３の上面に圧電素子１４の下面が当接し、圧電素子１４の湾曲が確実に防止される。この結果、圧電発音体１に落下等による衝撃が加わった場合でも、圧電素子１４のクラック発生や一部剥離を防止できる。

【００２５】

また、前記各湾曲防止柱３を、前記電極１６に沿って片側３個ずつ、合計６個配置しているので、これらの湾曲防止柱３により圧電素子１４の湾曲を６箇所で防止し、圧電素子１４のクラック発生や一部剥離を確実に防止できる。

【００２６】

次に、図５乃至図１０を参照して本考案の他の実施例を説明する。

【００２７】

図５、図６に示す圧電発音体１Ａは、底板２１ａを備え上部が開口した四角筒状の下部支持ケース２１と、この下部支持ケース２１の開口を施蓋して下部支持ケース２１との間で音響室２３を形成する四角形状の上部支持ケース２２と、前記下部支持ケース２１の内側壁部に設けた段部２１ｂにより支持した圧電素子１４及び導体からなる振動板１５のユニモルフ構造の圧電振動体１２と、前記下部支持ケース２１の底板２１ａから上方に突設され前記圧電素子１４の近傍に上端を臨ませた少なくとも一個以上の下部湾曲防止部材２４ａと、前記上部支持ケース２２の下面から下方に突設され前記振動板１５の近傍に下端を臨ませた少なくとも一個以上の上部湾曲防止部材２４ｂと、前記上部支持ケース２２の下面側部から圧電振動体１３側に向けて突設され、この圧電振動体１３を前記段部２１ｂ上に固定する突部２２ａと、図７乃至図９にも示すように前記下部支持ケース２１の一方の側壁から底部に亘って配置した素子側電極部２５と、前記下部支持ケース２１の他方の側壁から底部に亘って配置した振動板側電極部２６とを具備している。尚、前記下部湾曲防止部材２４ａ，上部湾曲防止部材２４ｂは、いずれか一方だけ設ける構成としてもよい。

【００２８】

素子側電極部２５は、前記下部支持ケース２１の肉厚部、前記上部支持ケース２２の内部を経て音響室２３側に導出された連結電極部２５ａにより前記圧電素子１４に接続している。

【００２９】

また、振動板側電極部２６は、前記下部支持ケース２１の肉厚部、前記上部支持ケース２２の内部を経て音響室２３側に導出された連結電極部２６ａにより前記振動板１５に接続している。

【００３０】

尚、図５，図６、図８中、２７は下部支持ケース２１に設けた前記音響室２３と外気とを連通する放音穴である。

【００３１】

上述した構成の圧電発音体１Ａによれば、圧電発音体１に落下等による衝撃が加わり、前記圧電素子１４がその曲げ強度以上に湾曲しようとする場合でも、図１０に示すように、前記下部湾曲防止部材２４ａ，上部湾曲防止部材２４ｂが前記圧電素子１４の曲げ強度以上の湾曲を下面、上面において各々防止することになり、この結果、圧電素子１４のクラック発生や一部剥離を確実に防止することができる。

【００３２】

尚、前記下部湾曲防止部材２４ａ，上部湾曲防止部材２４ｂの各々の突設個数は、任意個数として実施可能である。

【００３３】

本考案は、上述した実施例に限定されるものではなく、その要旨の範囲内で種々の変形が可能である。

【００３４】

【考案の効果】

以上詳述した本考案によれば、上述した構成としたので、前記圧電素子に曲げ強度以上の外力が作用しても湾曲防止部材により圧電素子の湾曲が防止され、これにより、圧電素子のクラック発生や一部剥離を防止できる圧電発音体を提供することができる。

【００３５】

また、本考案によれば、湾曲防止部材を支持ケースにおける音響室の底面中央部に設けた電極の片側又は両側に各々少なくとも一個以上設けたので、これらの湾曲防止部材により圧電素子の湾曲を複数箇所で防止し圧電素子のクラック発生や一部剥離を確実に防止できる圧電発音体を提供することができる。

【００３６】

さらに、本考案によれば、湾曲防止部材を、ユニモルフ構造の圧電振動体の上面又は下面の近傍まで各々少なくとも一個以上突設したので、圧電振動体の上面又は下面において曲げ強度以上の湾曲を各々防止し、圧電素子のクラック発生や一部剥離を確実に防止できる圧電発音体を提供することができる。